



## Transportation Services Division

# EAST OF 951 HORIZON STUDY FOR BRIDGES AUGUST 2008



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# East of 951 “Build-Out” Horizon Study Bridge Component

## Purpose

The East of County Road 951 Infrastructure and Services Horizon Study is a project that identifies three levels of service options for public infrastructure and service outlays for the area east of CR 951. These areas include public utilities, schools, parks, law enforcement, emergency services, fire, libraries, storm water management and transportation.

Of the services and infrastructure discussed, transportation and public utilities are the keystone elements. The locations of other services and institutions such as emergency and fire services, schools, parks and libraries depend heavily on locations of roads, potable water and wastewater lines. Decisions on capital infrastructure and service provisions cannot be made in a vacuum, and an intensive public participation program for the area east of CR 951 has provided a vision from property owners, residents, and other affected parties regarding identified infrastructure and public services needs.

Through this process, the need for additional connectivity in the Estates was discussed and a recommendation was made that Transportation Services should work with other agencies to identify opportunities where additional connectivity could serve multiple purposes and agencies consistent with Objective 6.3 of the Golden Gate Area Master Plan approved as part of the Growth Management Plan which states:

“In planning and constructing road improvements within Golden Gate Estates and Golden Gate City, Collier County shall coordinate with local emergency services officials to ensure that the access needs of fire department, police and emergency management personnel and vehicles are met.”

The Transportation Division’s 5 year work program already identifies the need for bridge maintenance and contemplates new bridge construction. The Metropolitan Planning Organization’s Long Range Transportation Plan update will include the information collected from this study and the priorities adopted by the Board of County Commissioners (BCC). The purpose of this bridge study is to identify, evaluate and prioritize new bridge locations that address emergency response time, mobility, service efficiency and public sentiment east of CR 951.

## Evaluation and Selection Process

The study included several key steps:

- Transportation staff identified potential new bridge connections from the existing roadway grid east of County Road 951 that was severed due to the canal system.
  - One approved bridge and seven possible locations for new bridges and three study areas were identified. A map was created depicting these bridges and study areas. It is important to note that Bridge 1 was shown as an approved bridge location as per the Growth Management Plan Golden Gate Area Master Plan and is not included in the ranking matrices.
- Staff contacted key stakeholders, including the public that would benefit from the connectivity and mobility provided by new bridges.
  - The stakeholders included: Big Corkscrew Island Fire Control and Rescue District (BCIFD), Collier County Emergency Management Services (EMS), Golden Gate Fire Rescue District (GGFD), Parks, Forestry Service, The Conservancy and Audubon Society, Public Utilities, Big Cypress Basin, Collier County School District, the Collier County Sheriff's Office and the public.
- The evaluation process was broken down into four categories and corresponding criteria:
  - **Emergency Response (Fire, EMS, Sheriff and Forestry)**
    - Change in Response Time
    - Proximity to Agency (Insurance Qualification)
  - **Mobility and Evacuation (Transportation Services)**
    - Increased evacuation options
    - Connection to existing or planned signalized intersections
    - Access to existing or planned arterials
    - Reduced trip length

- **Service Efficiency (School District, Parks, Public Utilities and Big Cypress Basin)**
  - School bus efficiency
  - Connectivity to existing or planned school sites
  - Connectivity to existing or planned park sites
  - Potential utility crossings and control structures
- **Public Sentiment**
  - All of the above
  - Local knowledge
  - Quality of life

The stakeholders were asked to evaluate and rank the seven bridge locations as well as determine the best bridge location in the study areas based on the above criteria. After all rankings were completed by the outside agencies, staff compiled and evaluated the data. The original study included three "Study Areas" in which the outside agencies were to review and determine the best location for a bridge within that area. Additionally, a new bridge was also recommended. Based upon those recommendations, a new map was created with eleven (11) potential bridge locations. The agencies were asked again to re-evaluate the potential bridge locations and re-rank them. A Public Information Meeting was then held July 2, 2008 to solicit input from the community with the benefit of the agency stakeholder recommendations and comments.

The four categories that were used in evaluating the potential bridge sites each have their own specific need and value to the community. The categories have been detailed below to provide more information on some of the considerations that were used in the evaluation. A detailed view of the rankings can be found in Appendix C.

- **Emergency Response**

In providing the rankings for the eleven bridge locations the various agencies making up the "Emergency Response" category (Big Corkscrew Island Fire District, Golden Gate Fire District, Emergency Management Services, Forestry Service and Collier County Sheriff's Office) were centered primarily on two components: time and distance.

Decreasing response times can be a matter of life and death. The medical standard for response time is eight minutes as that is the time required in cases of cardiac arrest, if brain injury or death is to be avoided. For areas within the Estates that have a response time greater than 8 minutes, the addition of bridges is important to reduce those response times.

When fighting a fire, every second counts in trying to contain or extinguish a fire. In the US, every year hundreds of thousands of structural fires occur, causing billions in damages. According to the most recent data available by FEMA, a residential fire is reported every 80 seconds, and while statistical data shows a significant decrease in civilian fire deaths and injuries, the number of fires in the United States continues on a steady rise. Therefore, distance to the fire is an important issue. The fire districts use a 5-mile drive distance as their measurement. By adding bridges it is anticipated the Insurance Service Organization (ISO) rating will decrease thus homeowners could see a reduction in their homeowners insurance from 10-40% as the new bridges would decrease response time and mileage to some remote areas.

The ISO ranks properties on a scale from 1-10. If properties are within 5 driving miles of a fire station, the property is automatically ranked as a 9. If properties are outside a 5 mile driving distance, the property is classified a 10 which means there is no fire service protection and thus, those properties pay a much higher rate of insurance. Items which affect the ISO rating in reducing it from a 9, depends on staffing levels, staff training, apparatus, record keeping, etc. for the fire district. Currently properties within a 5 mile driving distance are ranked a 5 in the BCIFD's boundaries while properties within a 5 mile driving distance are ranked a 4 in the GGFD boundaries. Estates properties outside the 5 mile driving distance are ranked a 10.

Bridge 4 is the most important bridge for BCIFD as it would decrease response time by two minutes to some areas and would provide needed secondary egress for emergencies. This bridge also brings portions of areas on 20<sup>th</sup> Street and 22<sup>nd</sup> Street into the five road mile range thus giving those property owners fire protection and potentially decreasing their property owner Insurance. Bridge 11 and Bridge 8 were the most important for GGFD. Bridge 11 reduced their response time by twenty seconds to some areas and Bridge 8 reduced their response time by three and one-half minutes to other areas with Vanderbilt Beach Road extension and connectivity to the north. Bridges 2 and 3 are ranked high for fire, emergency management and the sheriff as they would allow for a significant savings for mutual aid to the roadways off 16<sup>th</sup> St NE and 8<sup>th</sup> St. NE.

- **Mobility and Evacuation**

While evaluating this category, staff considered existing roadways and signalized intersections as well as planned improvements. Staff also considered evacuation concerns that were evident from the recent and historical wildfires that have impacted areas east of CR-951. Bridges 2 and 3 located on 8<sup>th</sup> and 16<sup>th</sup> Street NE scored high based on their even spacing, existing connectivity to Golden Gate Boulevard and Randall Boulevard and their potential connection to Vanderbilt Beach Road Extension. They clearly establish a north south grid in the Estates connecting to three existing or proposed arterials.

Bridges 6 and 7 located on 18<sup>th</sup> Avenue NE also completed an evenly spaced east west road that ties into an existing bridge network, two schools and would connect from Wilson Boulevard all the way to the Big Cypress DRI. Bridges 4 and 5 located

on 47<sup>th</sup> Avenue NE and Wilson Boulevard (North of Immokalee) also complete the existing grid system.

Evacuation is a function of providing an alternative or faster route in response or anticipation of an event such as hurricane or wildfire. The bridges noted above would provide secondary evacuation routes and alternative direction evacuation routes.

▪ **Service Efficiency**

Agency rankings comprised of the public services category included public utilities, school district, Big Cypress Basin, and parks. Adding more bridges to the Estates will provide for more efficient public services to the area.

The proposed construction of water and sewer plants, that provide sewer, potable water and raw water require collection and distribution lines to and from facilities and homes they service. They would have the ability to take advantage of new bridges to span the canals along the chosen corridors.

Bridges will also allow for better bus routes for schools resulting in increased zoning flexibility and bus transportation efficiency. Ultimately this translates into cost savings by reducing bus route mileage and potentially allowing for pedestrian access to schools.

▪ **Public Sentiment**

The information gathered from staff and the outside agencies was presented to the public to consider and evaluate. The public was asked to consider emergency response and mobility while also considering how that would impact their quality of life. Local knowledge was also solicited and proved beneficial in the evaluation of Bridge 11 located on 14<sup>th</sup> Avenue SE. The public comments noted that there was an existing drainage control structure located on 20<sup>th</sup> Avenue SE that could be used in emergencies. It was also commented that a bridge on 10<sup>th</sup> or 12<sup>th</sup> Avenue SE might better serve the area with the existing and planned schools on the west side of Everglades Boulevard. There was also discussion that a bridge at 16<sup>th</sup> Avenue SE might prove useful since the Long Range Transportation Plan shows a future connection at that location. Comments from the public justified that location of Bridge 11 should revert back to a study area until such time that more information is available.

In reviewing the public sentiments (Appendix D) there were several common themes that were consistent in their responses.

- Support for better access, evacuation, emergency services, fire response and insurance relief
- Concern for increased traffic, property values, and safety
- Site specific concerns versus overall benefit and need

## **Public Involvement Plan (PIP)**

A critical component of the Horizon Study is public involvement. It was decided that the value of the bridge component and the impacts to a more localized area would require its own PIP. A public meeting was held on July 2, 2008 at 7 p.m. at the Oakridge Middle School cafeteria with over 150 in attendance. Two weeks prior to the meeting over 1500 postcards were mailed to property owners on roadways where a potential bridge was identified. One week before the meeting, ads were placed in the Naples Daily News and Collier Citizen. Five days before the meeting, a variable message board sign was placed in the median on CR 951 and one was placed in the median on Golden Gate Boulevard announcing the meeting. News media also covered the meeting, with ABC-7 conducting an interview with staff and airing the story the day before the meeting as well as stories being printed in both the Naples Daily News and the Collier Citizen. Information regarding the bridge study was also posted on the Transportation Planning website along with a survey to gain public input. The input from the public information meeting as well as the survey information from the website were accumulated and are located in Appendix E.

As mentioned above, due to concerns raised at the public meeting regarding the location of Bridge 11 on 14<sup>th</sup> Avenue SE, it was decided to re-evaluate the location of that bridge and turn it back into a study area. An additional 1100 postcards were then mailed to property owners on 10<sup>th</sup> Avenue SE, 12<sup>th</sup> Avenue SE, 14<sup>th</sup> Avenue SE, 16<sup>th</sup> Avenue SE, 18<sup>th</sup> Avenue SE and 20<sup>th</sup> Avenue SE notifying the property owners that Bridge 11 was going to revert back to a study area. This was done so that these residents would have the same benefit of notification as the prior mailing group.

A complete copy of the PIP documents and reporting can be found in Appendix E.



## Costs Analysis

A brief cost estimate was prepared using the FDOT Bridge Development Report (BDR) cost estimating guidelines and the following exceptions are to be noted:

- Estimating the bridge cost using the BDR guidelines is done after the completion of the preliminary design which includes member selection, member sizes and member reinforcing. No preliminary designs were available for these bridges.
- The FDOT estimating process develops a cost for the bridge superstructure and substructure from beginning to end bridge. Costs for all other items including but not limited to the following were excluded from the costs: mobilization, operations costs for existing bridges, walls, deck drainage systems, embankments, fenders approach, slabs, load test and bank stabilization.

The following assumptions were made for the type of proposed 2 lane rural and 4-lane rural structures provided in the study.

- The bridge length was determined based on a typical canal bottom width of 30 feet and 2.1 embankment slopes between 6-foot wild life berm at each end bent. The assumed bridge length is 101 feet. It was also assumed that the bridges will be single spans at each crossing. For canals, that may provide utility crossing, an additional bent was added to the cost. All bridges were evaluated using the AASHTO Type IV beam. Pre-stressed concrete piles were assumed based on typical foundations in Florida

### BRIDGE COSTS

Proposed Bridge Type	Design Cost (\$)	CEI Cost (\$)	Deck Cost/sqft (\$)*	Est. Constr. Cost (\$)	Total Est. Cost (\$)
2-ln rural	135,608	77,504	135	775,035	<b>988,147</b>
4-ln rural	150,000	110,228	135	1,102,275	<b>1,362,503</b>
2-ln rural w/utility	145,608	77,504	135	775,035	<b>998,147</b>
4-ln rural w/utility	160,000	110,228	135	1,102,275	<b>1,372,503</b>

Complete cost estimate information can be found in Appendix F.

## FINAL RANKINGS

The public was asked to list the most important reason to add new bridges east of CR-951. They ranked their priorities in the following order:

1. Better evacuation and emergency response times for fire, EMS and sheriff
2. Better access and mobility
3. Better services for schools, parks and utilities

	<b>EMERGENCY RESPONSE</b> <i>(fire, ems, sheriff, forestry service)</i>	<b>MOBILITY</b> <i>(transportation)</i>	<b>SERVICE EFFICIENCY</b> <i>(school district, parks, public utilities, big cypress basin)</i>	<b>PUBLIC</b> <i>(rankings provided at PIP 7/2/08 )</i>
<b>Rank</b>				
<b>#1</b>	<b>Bridge 2</b> - response time reduced 2 minutes BCIFD	<b>Bridge 3</b>	<b>Bridge 5</b>	<b>Bridge 2</b>
<b>#2</b>	<b>Bridge 3</b> - response time reduced by 2 minutes BCIFD	<b>Bridge 2</b>	<b>Bridge 8</b>	<b>Bridge 3</b>
<b>#3</b>	<b>Bridge 4</b> - response time reduced by 2 minutes BCIFD	<b>Bridge 5</b>	<b>Bridge 6</b>	<b>Bridge 6</b>
<b>#4</b>	<b>Bridge 12</b> - critical for wildfires for BCIFD/Forestry	<b>Bridge 11*</b>	<b>Bridge 4</b>	<b>Bridge 7</b>
<b>#5</b>	<b>Bridges 9</b> Forestry, EMS, GGFD	<b>Bridges 4</b>	<b>Bridge 7</b>	<b>Bridge 8</b>
<b>#6</b>	<b>Bridge 6</b> - Sheriff	<b>Bridge 7</b>	<b>Bridge 3</b>	<b>Bridge 9</b>
<b>#7</b>	<b>Bridges 7 (Sheriff) &amp; 11*</b> Sheriff/Forestry/GGFD	<b>Bridge 6</b>	<b>Bridge 2</b>	<b>Bridge 4</b>
<b>#8</b>	<b>Bridges 8 &amp; 10</b> - response time reduced by 3.5 minutes for <b>Bridge 8</b> by GGFD (pending VBR extension and connectivity to the north)	<b>Bridge 8</b>	<b>Bridge 9</b>	<b>Bridge 12</b>
<b>#9</b>	<b>Bridge 5</b> - response time reduced by 2 minutes BCIFD	<b>Bridge 9</b>	<b>Bridge 12</b>	<b>Bridge 5</b>
<b>#10</b>		<b>Bridges 10</b>	<b>Bridge 10</b>	<b>Bridge 11*</b>
<b>#11</b>		<b>Bridge 12</b>	<b>Bridge 11*</b>	<b>Bridge 10</b>

\*Based upon public comments at the public information meeting, Bridge 11 was reverted back to a study area until further research is completed to determine the best location for this bridge. The study area is shown on the attached map in Appendix A.

## RECOMMENDATIONS

Based on agency rankings, staff evaluation, public rankings and comments, Bridges 2 and 3 scored the highest. As such, it is recommended that these two are installed first and at the same time. By installing them together, it will disperse the traffic between the two adjacent facilities. Bridges 4, 5, 6 and 7 also ranked fairly high in all areas and should be considered the next logical locations for bridges as funding allows. Bridge 12 ranks high for emergency response but scores low in other areas. Staff would recommend that Bridge 12 is considered with the prior group as funding allows or seeks a modified design which may satisfy emergency response. Bridges 8, 9, and 10 would be recommended as new roadways and schools are constructed. Funding may be from alternative sources.

Bridge 1 is being constructed as part of the White Boulevard bridge replacement project. Bridge 1 was approved as per Policy 6.1.1 and Policy 7.3.1 of the Golden Gate Master Plan adopted into the Growth Management Plan December 2003.

- Policy 6.1.1

In planning to increase the number of route alternatives through the Estates Area, the Collier County Transportation Division will prioritize the following routes over other alternatives:

- a. The extension of Vanderbilt Beach Road from its current terminus to DeSoto Boulevard.
- b. The development of a north-south connection from the eastern terminus of White Boulevard to Golden gate Boulevard.
- c. The development of a new east-west roadway crossing the Estates Area south of Golden gate Boulevard.

- Policy 7.3.1

By 2006, the Collier County Bureau of Emergency Services, the Collier County Transportation Division, Golden Gate Fire Control and Rescue District, and other appropriate Federal, State or local agencies, shall begin establishing one or more of the following routes for emergency evacuation purposes:

- a. An I-75 Interchange at Everglades Boulevard.
- b. Improved emergency access from Everglades Boulevard to I-75.
- c. Construction of a north-south bridge on 23<sup>rd</sup> Street, SW, between White Boulevard and Golden Gate Boulevard.

Construction of Bridge 1 is anticipated in 2010 subject to funding.

After receiving many comments about the location of Bridge 11, it was reverted back to a study area encompassing an area from 10<sup>th</sup> Avenue SE south to 20<sup>th</sup> Avenue SE. There was no clear consensus on the best location of that bridge. Until further study is completed, and funding becomes available, it is recommended that this bridge location remain a study area.